

ECOLOGY OF A HOT KARRI FIRE

by

G.L. LIDDELOW

The aim of the experiment was to study the effects of a fire of wildfire intensity on the plant and animal communities of a karri forest area.

By recording the numbers and species of plants before the burn, any changes after the burn can be seen by further sampling. The same procedure can be used on the birds and animals. Through this it may be possible to relate changes in the fauna of the area to the changes in the plant community.

The area chosen for the experiment was in the Pemberton district at Warren Block. It comprised approximately 40 ha and had been unburnt for 20 years or more.

Due to the large number of Bush Rats (Rattus fuscipes) in the area, this was the animal selected to be studied. Others to be caught were the Mardo (Antechinus flavipes), Dunnart (Sminthopsis murina) and the introduced European rat (Rattus rattus). Three different sites are being studied, Sword Grass Plot (wet site); Open Forest Plot (ridge site) and the Control Plot (similar to Open Forest).

Trapping is carried out in each plot once a month on a grid system wherein 25 traps are rotated on a daily basis, giving a total of 100 trapping nights over 4 days. This gives us information on the movement as well as the numbers of rats in the area.

Trapping started on the 6th October, 1971. All animals caught are marked with ear tags and released after being weighed, measured and their sex and breeding condition noted. Total trapping numbers up till 23rd November, 1973 can be seen in Table 1.

The area was burnt to wildfire intensity on 17th January, 1972, with scorch height in places over 70 metres. The Control plot was left unburnt. Before the fire trapping results were similar in all areas (see Figs 1, 2 and 3). However after the fire over a period of six to eight weeks

rats disappeared from the Sword Grass and Open Forest Plots. The numbers of adults gradually decreased, possibly due to predation in the open burnt habitat. Also the years crop of young which made the numbers in the Control Plot rise (Fig. 3) failed to establish themselves in the burnt plots.

The introduced or European mouse (Mus musculus) started to appear in the Sword Grass and Open Forest Plots in May and June 1972. They replaced the Bush rat over the next season. The Bush rat started to reappear in the Sword Grass Plot again in December 1972 after the next breeding season. However it was not until November 1973, the second breeding season after the fire, that the first rat was once again caught in the Open Forest Block.

The sampling of the bird population of the area was restricted to visual counts because at the beginning the calls of the birds were not known. The sampling procedure is to record species and numbers along five transect lines at 65 metre intervals using an "Audubon Bird Caller" to attract them. The birds are recorded in 4 vegetation strata as follows:

Ground cover to	1 metre
Scrub layer	1.3m to 3.3m
Lower tree canopy	5m to 25m
Upper tree canopy	26m to 65m

Before the fire there were a total of 24 species and 369 sightings on the transect lines whereas in the Control Plot there were 17 species and 113 sightings. Since the burn the species have increased to 46 in the burnt area and to 24 in the unburnt Control. The increase in species in the Control Plot is due mainly to the seasonal influx of Honeyeaters. The number of sightings have also increased to 2117 in the burn and 681 in the Control. The number of sightings which are high in both areas may be partly due to more surveys being done since the fire.

As can be seen from Figs. 4 and 5 there was a decrease in total numbers of birds and also numbers of species immediately after the burn along the transect lines. Also noticeable is that the unburnt Control numbers of species and total numbers have not changed greatly. However since

February 1972 there was a steady increase for the next 18 months to where the species have steadied in number and the total number of sightings is again starting to fall.

After the fire species favouring the dense undergrowth, e.g. Splended Wren (Malurus splendens) and Spotted Scrub Wren (Sericornis maculatus) disappeared. Other species favouring the open understorey or ground for feeding, e.g. Western Shrike-Thrush (Colluricincla rufiventris) and the Scarlet Robin (Petroica multicolor) have increased. There has also been an increase in the number of birds who feed at scrub height or lower tree level, e.g. Broad-tailed Thornbill (Acanthiza apicalis) and the Grey Fantail (Phipidura fuliginosa).

Two species which have come into the burnt area that are uncommon are the Weebill (Smicrornis breverostus), and the Western Shrike-Tit (Falcunculus frontatus).

The vegetation of the area is also sampled along the same transect lines as the birds. The same four vegetation strata are used here also.

In the Upper Tree Strata which includes Karri (Eucalyptus diversicolor) and Marri (E. calophylla) there have been no changes, as could be expected. Moving down into the lower tree strata the Marri and Karri regrowth at the top of this division is unaffected. However the Peppermint (Agonis flexuosa) and Casuarina (C. decussata) were killed by fire, but they are now starting to come back mainly from root stock.

In the scrub strata the Hazel (Trymalium spathulatum), Netic (Bossiaea laidlawiana) and Chorilaena (C. quercifolia) have been killed by the burn but all three species are regenerating from seed and are at present ranging in height from 0.6 m to 1.5 m.

The ground strata species of grasses, herbs, Sword Grass etc. have also returned and it is noticeable that the Sword Grass has come back thicker in the wet areas than before the fire. All through the burn the numbers of species of plants has increased since the burn. One section of the burn saw an increase of 100% in species (7-14); the average increase in all areas was 25%. Nearly all of the new species in this area have come from seed held in abeyance in the soil for many years. The majority of

these new species are Acacias, Bossiae and some herbs and grasses.

Since the vegetation is a long-term study to show any marked changes, more surveys will have to be done before any changes in density and abundance can be noted.

TABLE I

TOTAL TRAPPING DETAILS TO NOVEMBER 1973

	CONTROL	OPEN FOREST	SWORD GRASS
No. of TRAP NIGHTS	2225	2050	2050
No. of BUSH RATS CAUGHT	106	18	59
Total No. of CAPTURES	452	95	208
No. of MUS MUSCULUS CAUGHT	-	24	43
Total No. of CAPTURES	-	73	100
Other Species CAUGHT A. flavipes (Mardo)	1		
Sminthopsis murina (Dunnart)		1	

AVERAGE DAILY CATCH OF *Rattus fuscipes* AND *Mus musculus*
TO NOVEMBER 1973.

FIG. 1 SWORD GRASS

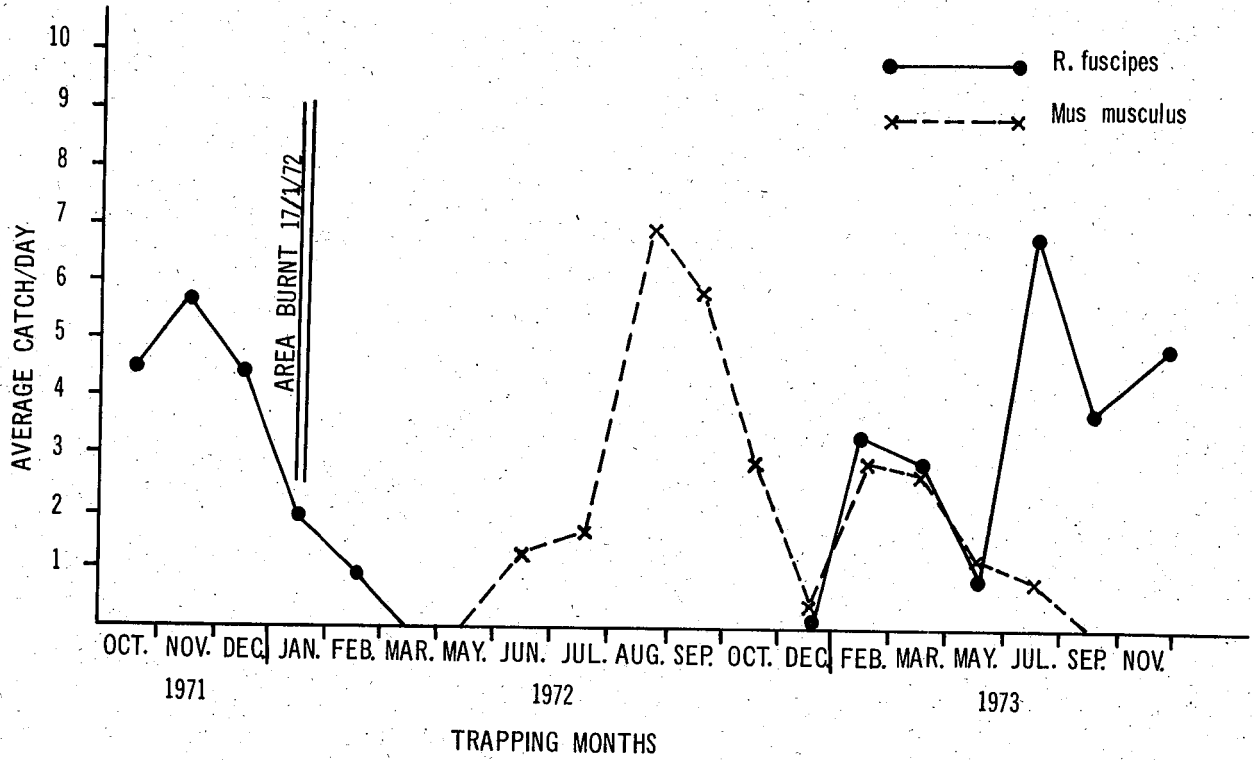


FIG. 2 OPEN FOREST

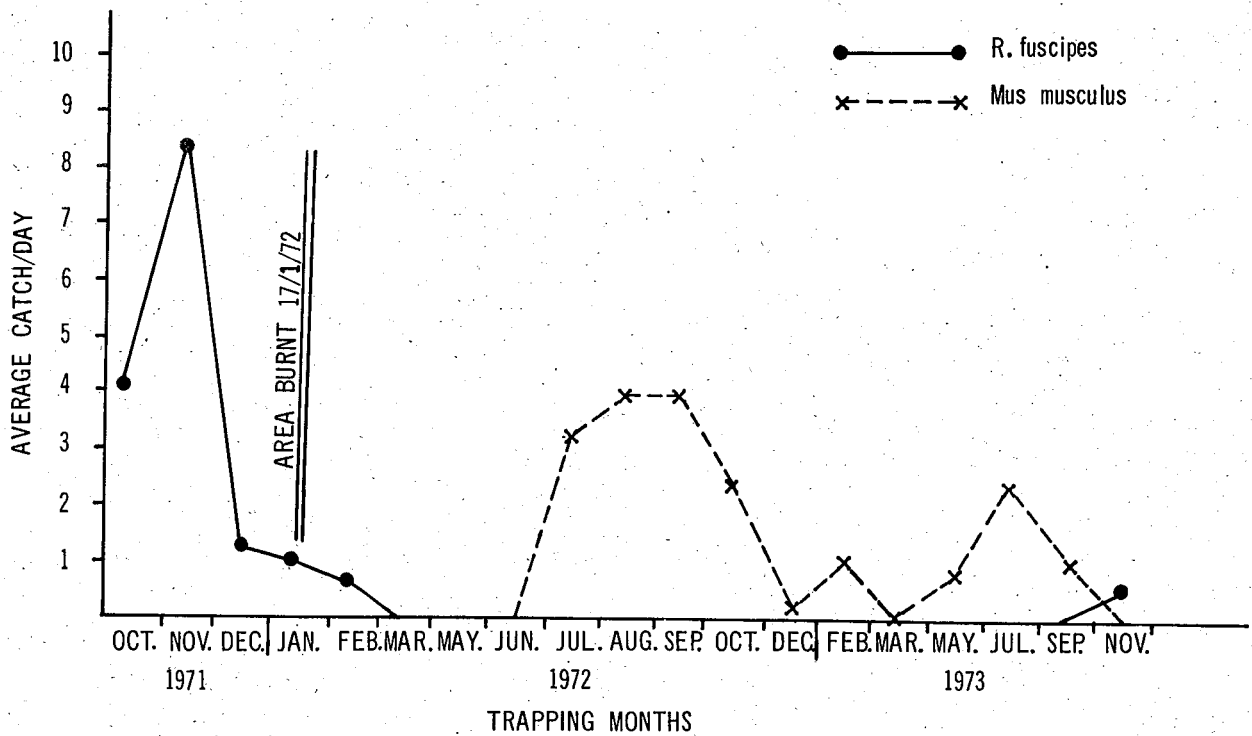


FIG. 3 CONTROL

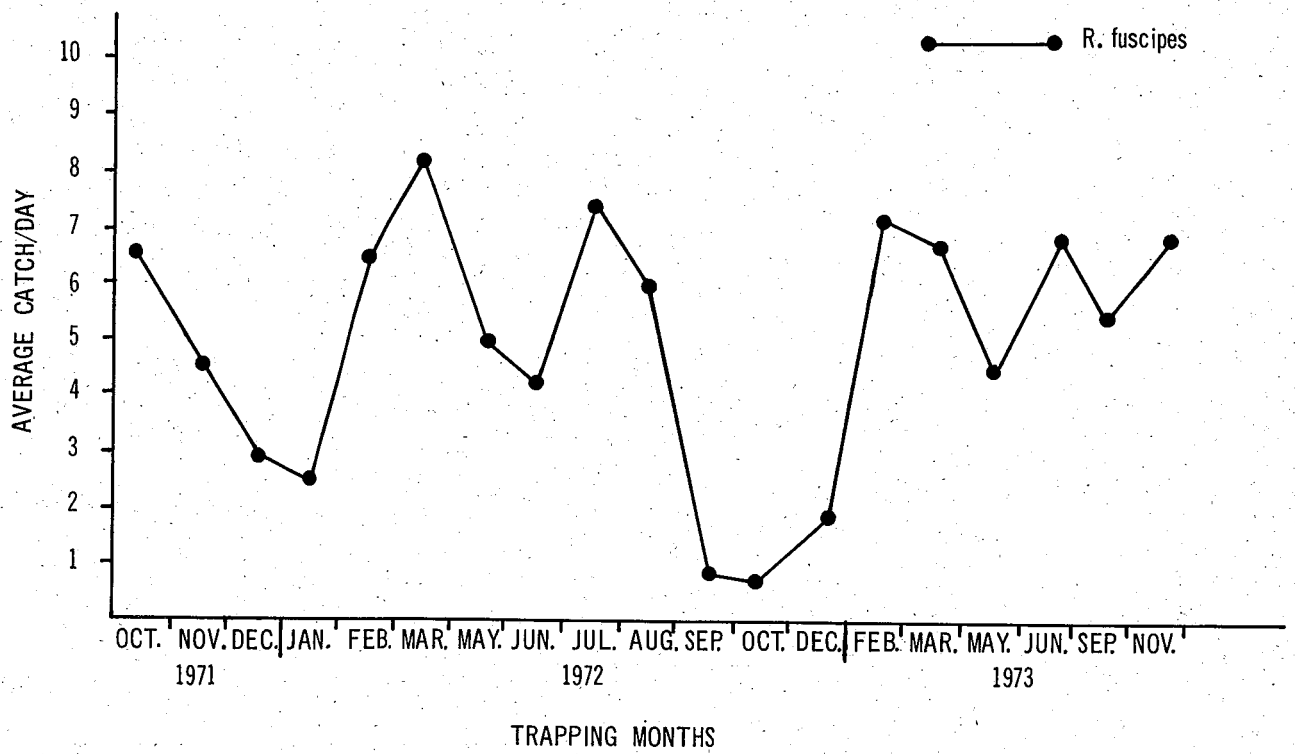


FIG. 4 TOTAL NUMBER OF BIRDS ON EACH SURVEY.

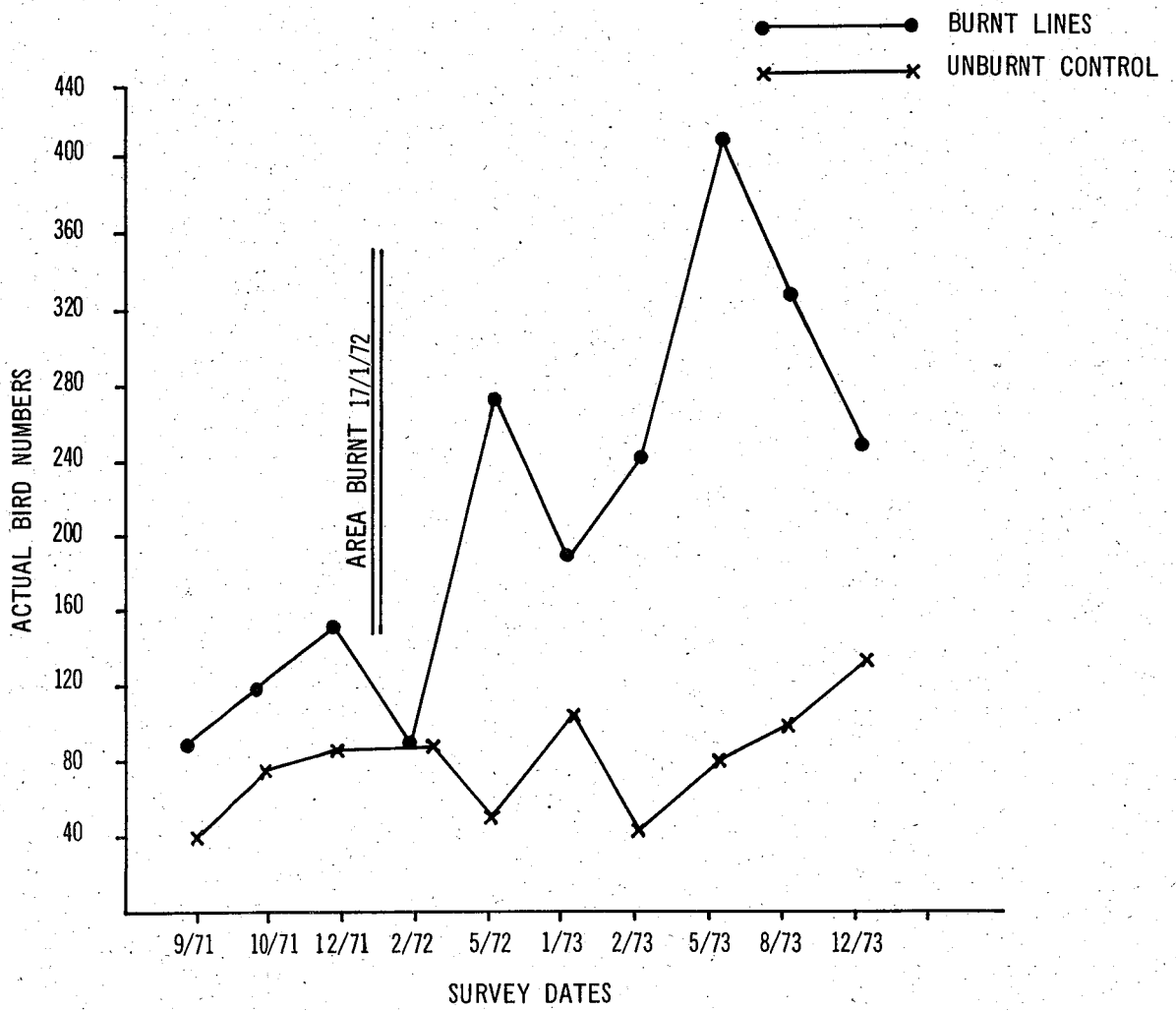


FIG. 5 TOTAL NUMBER OF SPECIES OF BIRDS ON EACH SURVEY.

